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REGION IV

PEER REVIEW CLEARANCE FORM

SEP 28 1988

Route To: Knight, Floyd, Tobin, Barrett Date Transmitted _____

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Peer Review Originator (Panel Member): James H. Finger 9/28/88

Project Title: Remedial Sampling Investigation
Carrier Air Conditioning Site
Collierville Municipal Wells
Collierville, Tennessee

Project Manager: Jim Gray

Originator's Instructions: If comments are not received within 10 working days from the transmittal date, it will be assumed that the report is acceptable as written.

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Information Copies Sent To: James Sargent, Felicia Barnett

Signature (Panel Member)	Date Received	Date Cleared	Concur	Non-Concur

Reviewing Officials	Date Received	Date Review Completed	Reviewer's Signature
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Reviewing Panel Member's Comments: _____

REMEDIAL SAMPLING INVESTIGATION
CARRIER AIR CONDITIONING SITE
COLLIERVILLE MUNICIPAL WELLS
COLLIERVILLE, TENNESSEE

INTRODUCTION

A sampling investigation was conducted of the city of Collierville, Tennessee municipal drinking water wells. The objective of this investigation was to identify suspected ground water contamination from the Carrier Air Conditioning Company NPL site.

The investigation was conducted by Mr. Jim Gray of the United States Environmental Protection Agency (US-EPA), Region IV, Environmental Services Division (ESD) and Felicia Barnett, US-EPA, Region IV, Waste Management Division, on July 19, 1988. The investigation was requested by Felicia Barnett, Regional Project Manager for the Carrier Air Conditioning Site.

SITE DESCRIPTION

The city of Collierville operates two municipal water well fields (Figure I). The west well field is located on the northwest corner of the Carrier Air Conditioning Company, less than 2000 feet from the plant. The east well field is located in downtown Collierville, approximately 1.5 miles from the plant.

The west well field (Figure II) contains two wells, each of which are finished to a depth of 300 feet. The field also has a water treatment system, an aerator, and a water storage tank. The east well field (Figure III) contains three wells. The east and west wells are finished to a depth of 300 feet, while the middle well is at 600 feet. The east field also contains a pumping station and water storage tank.

SITE HISTORY

In 1978, a filter cover failed on a vapor degreaser unit resulting in the spill of 2000-5000 gallons of trichloroethylene (TCE). According to Carrier officials, this material was washed into Nonconnah Creek by the local fire department. Soil samples collected by Tennessee Department of Health and Environment in April 1986, showed residual TCE present at the spill site. Prior to the implementation of RCRA, Carrier operated an unlined lagoon, approximately 214 cu. ft. in volume, for the storage of TCE contaminated paint sludges. Wastes and soil were removed from this lagoon which was closed just prior to November 19, 1980. The exact location of this impoundment has not yet been determined. In January 1985, following a heavy rainfall, a TCE leak from underground pipes was discovered. A clean-up effort by the company resulted in the recovery of 542 gallons of TCE. As a result of the spill, monitoring wells were installed into the Memphis Sands Aquifer on-site, and in January 1986, the state detected TCE contamination in several of the wells. TCE has also been detected in the raw water from the two Collierville municipal wells on the property.

SUMMARY AND CONCLUSIONS

Sample results show trichloroethylene (TCE) present in both wells of the city's west well field. TCE was still present at reduced levels in the west field's water after aeration and finishing. The TCE is assumed to be from the Carrier Air Conditioning site due to its proximity to the field.

The middle and west wells of the city's east well field contained aminonaphthalenol. The compound is used commercially as a polymerization inhibitor. The source of the aminonaphthalenol cannot be determined within the scope of this study. Samples of the finished water from the city's east field showed no trace of the compound.

SITE GEOLOGY/HYDROGEOLOGY

The area around Collierville, Tennessee includes two important aquifers. The topmost of these units is the Jackson formation. This formation is composed mostly of clay that can be locally sandy or silty. The Jackson formation is known to be over 300 feet thick below downtown Memphis, but it thins out rapidly toward Collierville, in southeast Shelby County.

Beneath the Jackson clay is a thick series of alternating sands and clays collectively known as the Claiborne group. The two lower sand units are prolific artesian aquifers known locally as the Memphis Sand Aquifer or the "500-foot sand." It is within this aquifer that the Collierville Municipal wells are finished. The aquifer provides over 95 percent of the ground water used in the Memphis area.

Below the Claiborne group is a series of sediments referred to as the Wilcox group. They contain a sand unit between two confining clay layers. The sand, known as the Fort Pillow of "1400-foot sand", is also an artesian aquifer which supplies about 5 percent of the ground water in the memphis area.

There are an estimated 2000 feet of unconsolidated sediments below the Wilcox group before reaching bedrock. However, they are of no hydrogeologic intrest to this investigation.

DATA DISCUSSION

Eight drinking water samples were collected during this investigation. Each of the five wells (two in the west field, three in the east field) which supply drinking water to Collierville, were sampled. Also, the aerated water at the west field was sampled prior to its arriving at the storage tank. The finished water was sampled from both well fields. Sampling locations are described in Table I and indicated in Figures II and III.

The samples were analyzed for the normal Target Compound List (TCL) parameters. Analytical data are summerized in Table III. Field measurement results of the samples collected are listed in Table II. Complete analytical data are attached as Appendix A.

Sample results show definite contamination of the city's west well field by TCE. Aeration and treatment of the water resulted in a considerable education of lowering the TCE concentration, but the compound was still detectable. The east well field is presumed to contain aminonaphthalenol in the ground water but the compound was not detected after treatment, prior to distribution. Inorganic compounds detected were normal and at concentrations unremarkable for municipal water, when compared to a maximum contaminant levels (MCL) listed in 40 CFR, Vol. 44. Field measurement results showed a pH of 8.75 for the finished water of the west field. City water department personnel were informed of the reading, and were unable to explain it.
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METHODOLOGY

This investigation was conducted in accordance with the "Remedial Sampling Investigation Study Plan, Carrier Air Conditioning Site, Collierville Municipal Wells, Collierville, Tennessee." All sample collection and sample handling techniques utilized were as described in the Engineering Compliance Branch Standard Operating Procedures and Quality Assurance Manual; US-EPA, Region IV, Environmental Services Division, April 1, 1986. Sample analyses were performed by the ESD Analytical Support Branch in accordance with the Analytical support branch Operation and Quality Control Manual, June 1985.

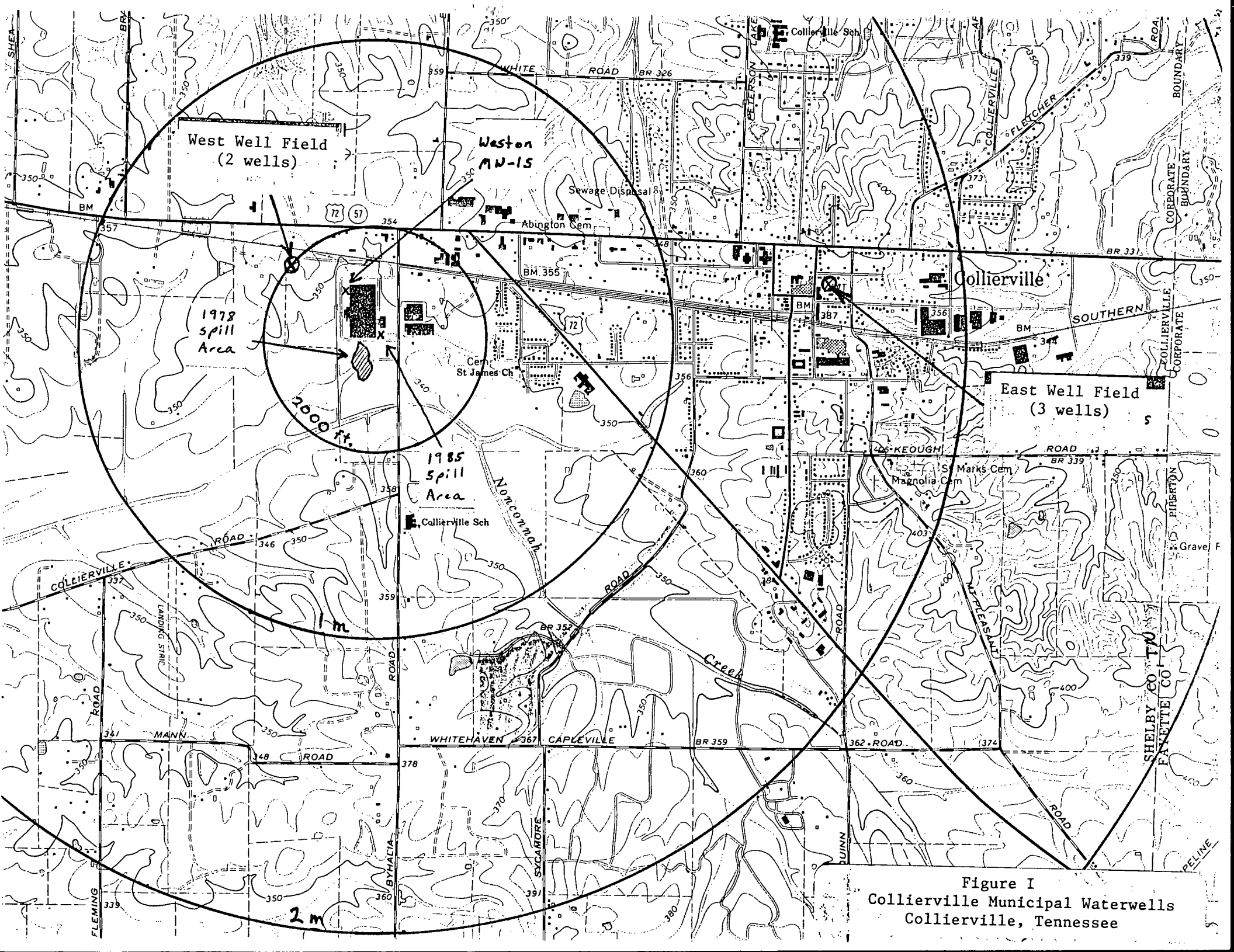

Figure I
Collierville Municipal Waterwells
Collierville, Tennessee

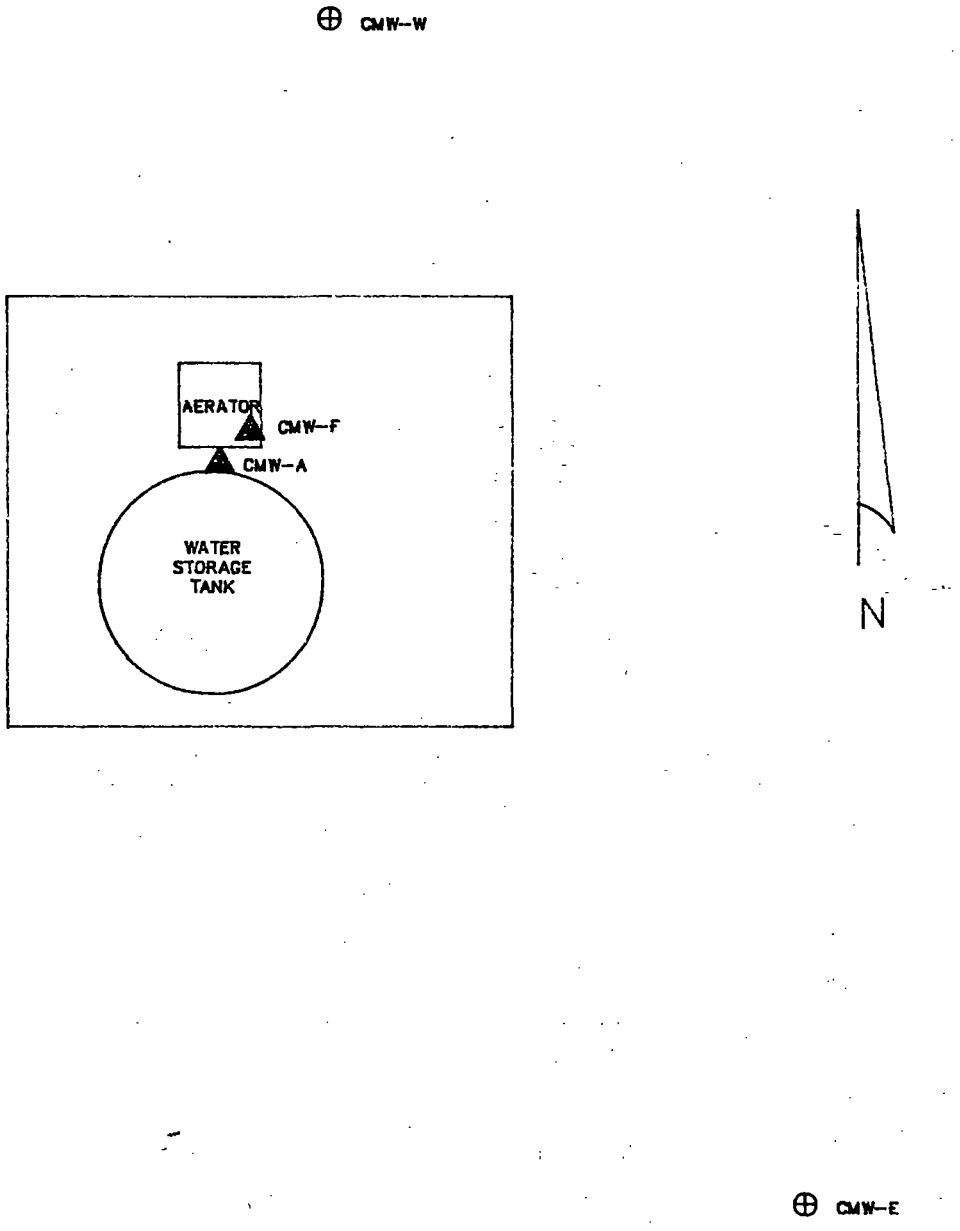

FIGURE II
WEST WELL FIELD
CITY OF COLLIERVILLE DRINKING WATER
COLLIERVILLE, TENNESSEE

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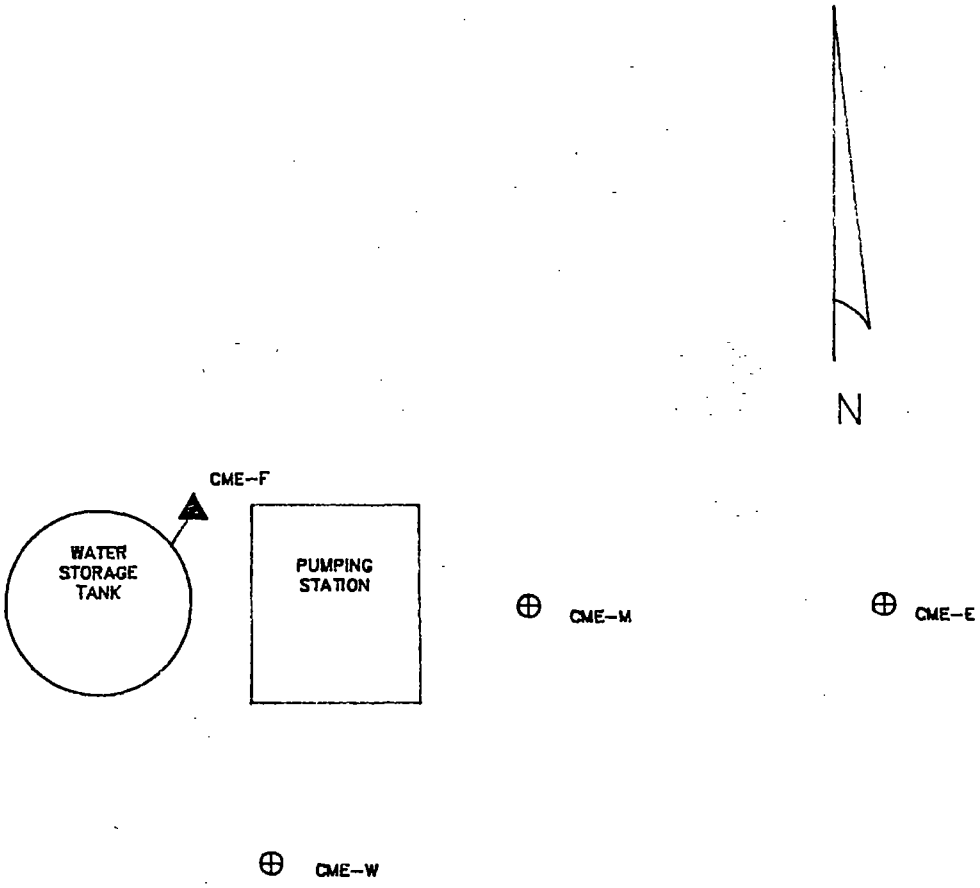

FIGURE III
EAST WELL FIELD
CITY OF COLLIERVILLE DRINKING WATER
COLLIERVILLE, TENNESSEE

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TABLE I
SAMPLE LOCATION DESCRIPTION
COLLIERVILLE MUNICIPAL WELLS
COLLIERVILLE, TENNESSEE

Sample Number	Location Description
CMW-E	A sample collected from the east well of the west field
CMW-W	A sample collected from the west well of the west field
CMW-A	A sample collected after the aerator of the west field
CMW-F	A sample of the finished water from the west field
CME-E	A sample collected from the east well of the east field
CME-M	A sample collected from the middle well of the east field
CME-W	A sample collected from the west well of the east field
CME-F	A sample of the finished water from the east field.

TABLE II
FIELD MEASUREMENTS OF DRINKING WATER SAMPLES
COLLIERVILLE MUNICIPAL WELLS
COLLIERVILLE, TENNESSEE

Sample Number	pH (su)	Conductivity (umhos/cm^2)	Temperature (^oC)
CMW-E	5.65	50	20.0
CMW-W	5.85	50	19.0
CMW-A	6.15	50	22.0
CMW-F	8.75	100	21.0
CME-E	5.50	30	19.0
CME-M	5.60	25	20.0
CME-W	5.75	65	20.5
CME-F	6.50	65	21.5

TABLE III
DRINKING WATER SAMPLE RESULTS
CARRIER AIR CONDITIONING
COLLIERVILLE, TENNESSEE
JULY, 1988

	CMW-E 07/19/88 0900	CMW-W 07/19/88 1020	CMW-A 07/19/88 1110	CMW-F 07/19/88 1145	CME-E 07/19/88 1330	CME-M 07/19/88 1415	CME-W 07/19/88 1510	CME-F 07/19/88 1545
INORGANIC ELEMENT/COMPOUND	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
BARIUM	12	12	12	11	--	--	12	10
COPPER	--	--	12	--	--	--	--	--
ZINC	--	29	34	--	--	--	--	--
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
CALCIUM	2.5	2.5	2.5	11	1.7	1.6	3.5	7.6
MAGNESIUM	0.95	0.96	0.95	0.99	0.67	0.61	1.3	0.89
IRON	--	--	0.088	--	--	--	--	--
SODIUM	6.2	6.9	7.6	7.8	4.7	2.8	8.6	5.4
EXTRACTABLE ORGANIC COMPOUNDS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
AMINONAPHTHALENOL	--	--	--	--	--	2JN	--	--
AMINONAPHTHALENOL (2 ISOMERS)	--	--	--	--	--	--	7JN	--
PURGEABLE ORGANIC COMPOUNDS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
TRICHLOROETHENE(TRICHLOROETHYLENE)	4.9J	8.8	2.9J	2.5J	--	--	--	--

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FOOTNOTES
NA - NOT ANALYZED
J - ESTIMATED VALUE
N - PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
-- - MATERIAL WAS ANALYZED FOR BUT NOT DETECTED